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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,362	11/19/2003	John L. Jorstad	036390-0102	3776
22428	7590	04/20/2006	EXAMINER	
FOLEY AND LARDNER LLP			TRAN, LEN	
SUITE 500			ART UNIT	
3000 K STREET NW			PAPER NUMBER	
WASHINGTON, DC 20007			1725	

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

48

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/715,362	JORSTAD ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Len Tran	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Response to Amendment*

1a. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 2, 4-14, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mehrabian et al (US 3,951,651), in view of Shibata et al (US '075) and further in view of Apelain et al (US 4,902,475).

Art Unit: 1725

Mehrabian et al disclose a method of making semi solid metal by combining a first solid metal portion and a separate second only liquid metal portion (abstract).

Shibata et al disclose an injection molding step for casting a semi-solid metal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to use the injection molding apparatus of Shibata et al, in Mehrabian in order to cast the semi-solid metal.

Mehrabian et al and Shibata et al disclose the claimed invention above, but fails to teach providing a refining grain agent into the shot chamber before the liquid metal and the metal comprise of A390 or A356.

However, Apelain et al disclose providing a grain refiner, such as phosphorous, for using a hypereutectic alloy (col. 2, lines 37-47). For hypoeutectic, a grain refiner, such as boron is used (col. 1, lines 39-49). The metals are A390 or A356 (Col. 1, lines 30-36). The grain refiners are used to expedite a fine grain microstructure (col. 1, lines 45-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to use grain refiners, such as phosphorus and boron, for A390 and A356 as taught by Apelain et al, in Mehrabian et al and Shibata et al in order to expedite fine grain microstructure.

In addition, it is inherent to have the slurry temperature for A390 and A356 is between 560 and 590 degrees C and 575 and 585 degrees C, respectively, since these temperatures are within the semi-solid phase.

Art Unit: 1725

4. Claims 3, 18-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mehrabian et al (US '298) and Shibata et al (US '075) as applied to claim 1 above, and further in view of Nakao et al (US 6,505,670).

Mehrabian et al and Shibata et al disclose the claimed invention above, but fail to teach providing a first solid portion before the second liquid portion in the shot chamber and removing a third portion from the molded part and put in the first chamber.

However, Nakao et al disclose the method of removing the third portion from the molded part as solid and put in the first chamber, then pour the liquid metal over the solid portion (col. 8, lines 54-col. 9, line 46) for the purpose of saving heat energy.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Nakao et al, pouring the liquid metal over the solid metal, with Shibata et al in order to save heat energy resulting in saving costs.

In addition, it is obvious to have surface area to volume ratio great than 10:1 and horizontal width at least two times greater than vertical depth, since that would depends on the final cast product.

#### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 1725

Applicant argues that Mehrabian et al (US '298) fail to teach a liquid only portion. However, new prior art, Mehrabian et al (US '651) disclose the claimed invention.

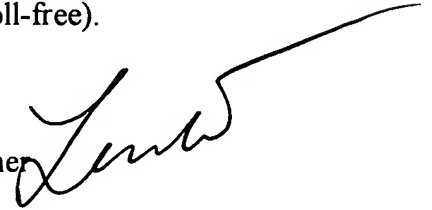
*Inquiry*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Len Tran whose telephone number is (571) 272-1184. The examiner can normally be reached on M-F, 8:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Len Tran  
Primary Examiner  
Art Unit 1725



April 16, 2006